



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE  
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Application No	:	09/982,656	Confirmation No: 8103
Applicants	:	Richard L. Guldi et al.	
Filed	:	October 18, 2001	
TC/A.U.	:	2856	
Examiner	:	Thomas Noland	
Docket No	:	TI-25047	
Customer No	:	23494	

**BRIEF ON APPEAL**

Commissioner for Patents  
PO Box 1450  
Alexandra, VA 22313-1450

Dear Sir:

In support of their appeal of the Final Rejection of claims in this application, applicants respectfully submit their brief.

**REAL PARTY IN INTEREST**

The real party in interest is Texas Instruments Incorporated, a Delaware corporation with offices at 7839 Churchill Way, Dallas, Texas 75251

**RELATED APPEALS AND INTERFERENCES**

There are no known related appeals or interferences.

**STATUS OF CLAIMS**

This is an appeal of claims 1 to 4, 7, 10, and 14 to 18, all of the rejected claims. Claims 5, 6, 8, and 9 are objected to by Examiner Noland as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. Claims 11 to 13 are withdrawn from consideration.

## **STATUS OF AMENDEMENTS**

Appellants did not file an amendment in response to the final rejection of April 26, 2004.

## **SUMMARY OF INVENTION**

The present application discloses a method to determine the particulate content of the exhaust from a process chamber. This method allows the source of the particulates to be identified and eliminated if desired. The preferred embodiment uses an in-situ particle monitor placed in the exhaust line so that effluent content can be monitored. When the particle count exceeds a certain threshold or upon some other predetermined event, such as a timing event, a particle sampling device is inserted into the exhaust stream. In the preferred embodiment, the particle sampling device comprises a moveable wand with a collector on the end. This collector can be removed and placed in an analysis tool, such as a SEM.

## **ISSUES**

Whether claims 1 to 4, 7, 10, and 14 to 18 are patentable under 35 U.S.C.S. § 103(a) over McAndrew et al. US 5,963,336 in view of Kai JP 1-261832.

## **GROUPING OF CLAIMS**

The claims do not stand or fall together for reasons set forth below under ARGUMENTS.

## **ARGUMENTS**

**Issue : Whether claims 1 to 4, 7, 10, and 14 to 18 are patentable under 35 U.S.C.S. § 103(a) over McAndrew et al. US 5,963,336 in view of Kai JP 1-261832.**

**1. The Office action did not established prima facie obviousness against claim 1.**

**a. The disclosed two-step method is not found in the prior art.**

Claim 1 describes a fabrication method that includes two distinctive steps. One step requires monitoring the exhaust of a process chamber and the other step requires automatically sampling the exhaust when a predetermined event occurs.

In the background section of the specification, applicants explained that due to the many sources of particulate generation, the density of particulates in the exhaust from a vacuum chamber is somewhat unpredictable. In-situ particulate monitors alone can detect the presence of particles, but do not indicate the source of particles. This leaves characterization and source determination to further inquiry.

Applicants further explained that the present application discloses an innovative way to determine the particulate content of the exhaust from a process chamber. This allows the source of the particulates to be identified and eliminated if desired. The preferred embodiment uses an in-situ particle monitor placed in the exhaust line so that effluent content can be monitored. When the particle count exceeds a certain threshold or upon some other predetermined event, such as a timing event, a particle sampling device is inserted into the exhaust stream. This collector can be removed and placed in an analysis tool, such as a SEM to identify the nature and therefore the source of the particles.

The Office action conceded that “the references do not specifically disclose sampling in response to a control signal...”<sup>1</sup> Because the cited references fail to disclose all the elements in claim 1, prima facie evidence of obviousness is not established.

**b. The cited references do not teach the problem or its source.**

Claim 1 directs to a problem with in-situ particulate monitors that it alone can detect the presence of particles, but can not indicate the source of particles in a typical fabrication situation. The Office action concedes that the McAndrew reference does not disclose activation of the sampling in response to a signal but reasons that such would have been an obvious expedient to avoid unnecessary

---

<sup>1</sup> Office action of April 26, 2004, p. 2, ll. 17-18.

sampling and in view of the teaching of Kai. This reasoning must fail because, the Kai, which the Office action relies to supplement the primary reference also does not teach activating a sampler in response to a signal either. Furthermore, neither one of the references teaches the problem of the inadequacy of in-situ particle monitoring. In fact, both references teach in-situ particle monitoring and both have the problem explained in this application.

It is well established that “a patentable invention may lie in the discovery of the source of a problem even though the remedy may be obvious once the source of the problem is identified.”<sup>2</sup> Because neither cited reference recognize the problem that claim 1 is designed to solve, the Office action falls short in establishing obviousness.

**c. ‘Obvious to try’ a combination is not prima facie obviousness.**

The Office action rejects claim 1 on the basis of “obvious to try” rationale. However, this is not the standard of 35 U.S.C. §103.”<sup>3</sup>

The Office action states that McAndrew et al. discloses sampling of the exhaust from an IC manufacturing process and the control of such system can be activated in response to alarm signals.<sup>4</sup> Even though the passage in the McAndrew reference cited in the Office action discloses an alarm, the alarm does not function as a trigger. On the contrary, the alarm is activated when the sampling result exceeds a predefined limit:

This embodiment is preferably used in conjunction with a visual and/or audio alarm system 22. The alarm system 22 can be activated upon the happening of a certain event, such as the detected absorption or gas concentration exceeding a predefined limit.<sup>5</sup>

The Kai reference, according to the Office action, teaches “particle measuring in response to a scattering triggering signal, a process analog to sampling in response to such a trigger since the counting of the particles in a particular batch of sample air could be considered to a sampling collection of that

---

<sup>2</sup> In re Peehs, 612 F.2d 1287. (CCPA 1980).

<sup>3</sup> In re Geiger, 815 F.2d 686 (Fed. Cir. 1987).

<sup>4</sup> Office action of April 26, 2004, p. 2, ll. 7-8.

<sup>5</sup> U.S. 5,963,336, col. 11, l. 66 – col. 12, l. 3.

particular batch.”<sup>6</sup> The argument must also fail because the Kai reference does not disclose any “trigger” or “response”. What is disclosed in the Kai reference is a monitoring system in which:

... [p]articles in sample air passing through the detection cell 11 generate light scattering by He-Ne laser 10 inside an active cavity. When this scattering is detected by the side-way scattering method in the detection cell 11, diameters of particles and the number of particles in sample air are counted by a particle measuring unit 1 so that cleanliness in a vacuum system of the semiconductor manufacturing equipment can be controlled<sup>7</sup>.

It is clear that the system disclosed in the Kai reference is only a straight forward particle monitoring system that includes a He-Ne laser to scatter the particle for a detection cell to measure the scattered signal.

If the rational of the Office action is followed, it can only be conclude that the rejection is based on “obvious to try” and only by re-naming the elements in the references and altering the sequence of events. Such rejection is improper.

**d. There is no basis in the art for combining references.**

It is well established that identification in the prior art of each individual part claimed is insufficient to defeat patentability of the whole claimed invention. Rather, to establish obviousness based on a combination of the elements disclosed in the prior art, there must be some motivation, suggestion or teaching of the desirability of making the specific combination that was made by the applicant.<sup>8</sup>

The references cited in the Office action do not motivate, suggest, or teach the desirability to combine a monitoring step with a sampling step upon an activating event.

First, the McAndrew reference discloses the following:

a chamber effluent monitoring system that has a light source and a main detector in optical communication with the sample region through one or more light transmissive window. The light source directs a light beam into the sample region through one of the one or more light transmissive

---

<sup>6</sup> Office action of April 26, 2004, p. 2, ll. 11- 14.

<sup>7</sup> JP-1-262832, Constitution.

<sup>8</sup> In re Kotzab, 217 F.3d 1365 (Fed. Cir. 2000).

window. The light beam passes through the sample region and exits the sample region through one of the one or more light transmissive window. The main detector responds to the light beam exiting the sample region. The system allows for in situ measurement of molecular gas impurities in a chamber effluent, and in particular, in the effluent from a semiconductor processing chamber.<sup>9</sup>

It is clear from reading the above passage, which is cited in the Office action as a base for rejecting claim 1, that there is no evidence of combining the two steps in claim 1.

Similarly, the Kai reference discloses a dust counter for controlling cleanliness of semiconductor manufacturing equipment as follows:

... Particles in sample air passing through the detection cell 11 generate light scattering by He-Ne laser 10 inside an active cavity. When this scattering is detected by the side-way scattering method in the detection cell 11, diameters of particles and the number of particles in sample air are counted by a particle measuring unit 1 so that cleanliness in a vacuum system of the semiconductor manufacturing equipment can be controlled<sup>10</sup>.

Again, there is no evidence indicating any motivate, suggest, or teach the desirability in the reference to combine a monitoring step with a step of sampling the exhaust when a predetermined event occurs in a chamber effluent monitoring system.

In summary, because (a) the references do not include the two-step method disclosed in claim 1, (b) the cited references do not teach the problem of the inadequacy of monitoring alone or the solution to this problem; (c) 'obvious to try' the combination is not prima facie obviousness; and (d) there is no basis for combining references, the Office action failed to establish prima facie obviousness in rejecting claim 1. Claim 1, therefore, stands patentable over the cited references.

## **2. The Office action did not establish prima facie obviousness in rejecting claim 7.**

Claim 7 describes a fabrication method that includes two distinctive steps. One step requires monitoring at least one signal of a process chamber and the other step

---

<sup>9</sup> U.S. 5,963,336, Abstract.

<sup>10</sup> JP-1-262832, Constitution.

requires automatically sampling the exhaust from the chamber when a predetermined event occurs

The Office action rejects claim 7 (as well as claims 2 to 4, 10, and 14 to 18) based on the same argument in the same paragraph with which it rejects claim 1.

Applicants respectfully submits that this rejection is also improper because: (a) the references do not include the two-step method disclosed in claim 7, (b) the cited references do not teach the problem of the inadequacy of monitoring alone or the solution to this problem; (c) 'obvious to try' the combination is not prima facie obviousness; and (d) there is no basis for combining references. Because the Office action fails to establish prima facie obviousness in rejecting claim 7, the claim stands patentable over the cited references.

**3. The Office action did not establish prima facie obviousness in rejecting claim 14.**

Claim 14 describes a wafer processing system that comprises three elements: a chamber with an exhaust; a particle monitor located in the exhaust; and a particle sampler. In addition, the particle monitor is connected to cause the sampler to gather sample from the exhaust.

The Office action rejects claim 13 as obvious for the same argument with which it rejects claims 1 and 7. The reason why the 103(a) rejection against claim 14 is improper is because: (a) the references do not the three element in claim 14 and the relationship between the elements and their distinct functions; (b) the cited references do not teach the problem of the inadequacy of monitoring alone or the solution to this problem; (c) 'obvious to try' the combination is not prima facie obviousness; and (d) there is no basis for combining references. Because the Office action fails to establish prima facie obviousness in rejecting claim 14, the claim stands patentable over the cited references.

**4. The Office action did not establish prima facie obviousness for rejecting claims 2, 3 and 4.**

Claims 2, 3, and 4 depend on claim 1 with additional limitations. In particular, claim 2 further limits the monitoring step; claim 3 further limits the sampling step; and claim 4 further limits the triggering event. Because the Office action failed to set forth proper evidence of prima facie obviousness against claim 1, the 103(a) rejection against claim claims 2, 3, and 4 are also improper.

**5. The Office action did not establish prima facie obviousness for rejecting claim 10.**

Claim 10 depends on claim 7 in which the predetermined event that triggers the sampling step is further limited. Because the Office action failed to set forth proper evidence of prima facie obviousness against claim 7, the 103(a) rejection against claim 10 is also improper.

**6. The Office action did not establish prima facie obviousness for rejecting claims 15 – 18.**

Claims 15 – 18 depend on claim 14 with additional limitations. In particular, claims 15 and 16 further limit the manner in which the sampler gathers samples; claim 17 further limits the makeup of the sampler; and claim 18 further limit the cause that triggers the sample gathering. Because the Office action failed to set forth proper evidence of prima facie obviousness against claim 14, the 103(a) rejections against claims 15 – 18 are also improper.

### **Conclusion**

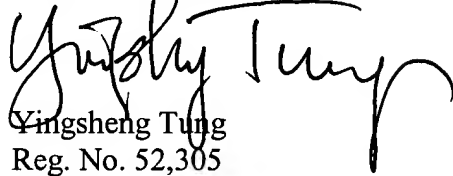
The Office action fails to establish prima facie obviousness in rejecting independent claims 1, 7, and 14 because (a) the references do not disclose all the elements in the claims; (b) the cited references do not teach the problem of inadequacy of particle monitoring system and method or its solution; (c) ‘obvious to try’ the combination is not prima facie obviousness; (d) there is no basis for combining references.

The Office action also did not establish prima facie obviousness in rejecting the dependent claims associated with the independent claims 1, 7, and 14 for the various reasons stated above.



Applicants respectfully request the Board to reverse the final rejection and allow the claims on appeal.

Respectfully submitted,

A handwritten signature in black ink, appearing to read 'Yingsheng Tung', written over the printed name.

Yingsheng Tung

Reg. No. 52,305

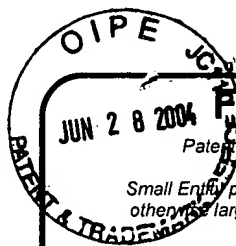
Attorney for Applicants

Texas Instruments Incorporated  
P. O. Box 655474, MS 3999  
Dallas, Texas 75265  
(972) 917-5355

## **APPENDIX**

The claims on appeal read as follows:

1. A fabrication method, comprising the steps of:  
monitoring the exhaust of a process chamber; and  
automatically sampling said exhaust when a predetermined event occurs.
2. The method of Claim 1, wherein said step of monitoring is done using an in-situ particle monitor.
3. The method of Claim 1, wherein said step of sampling is done by inserting a collection device into said exhaust.
4. The method of Claim 1, wherein said event is the detection of a particle excursion.
7. A fabrication method, comprising the steps of:  
monitoring at least one signal of a process chamber; and  
sampling the exhaust from said process chamber when a predetermined event occurs.
10. The method of Claim 7, wherein said predetermined event is the detection of a given particle flux by an in-situ particle monitor located in said exhaust.
14. A wafer processing system, comprising:  
a chamber with an exhaust;  
a particle monitor located in said exhaust, wherein said particle monitor is connected to cause a particle sampler to gather samples from said exhaust.
15. The system of Claim 14, wherein said sampler gathers samples by being inserted into said exhaust.
16. The system of Claim 14, wherein said sampler gathers samples by opening valves so that said exhaust passes to a sampling area.
17. The system of Claim 14, wherein said sampler is a membrane filter.
18. The system of Claim 14, wherein said monitor causes said sampler to gather samples when a predetermined particle flux is detected.



AF \$ PTO/SB/17 (1/98) IFW

## FEE TRANSMITTAL

Patent fees are subject to annual revision on October 1.

These are the fees effective October 1, 1997

Small Entity payments must be supported by a small entity statement, otherwise large entity fees must be paid. See Forms PTO/SB/09-12.

Complete If Known

Application Number	09/982,656
Filing Date	10/18/2001
First Named Inventor	Guldi et al.
Examiner Name	Thomas Noland
Group / Art Unit	2856
Attorney Docket No.	TI-25047

TOTAL AMOUNT OF PAYMENT (\$ 330.00)

## METHOD OF PAYMENT

1. ☒ The Commissioner is hereby authorized to charge to the following Deposit Account,

Deposit Account Number

20-0668

Deposit Account Name

Texas Instruments Incorporated

- ☒ Charge any additional fee required or credit any overpayment ☒ Charge all indicated fees and any additional fee required or credit any overpayment

2. ☐ Payment Enclosed:

☐ Check ☐ Money Order ☐ Other

## FEE CALCULATION

## 1. BASIC FILING FEE

Large Fee Code	Entity Fee (\$)	Small Fee Code	Entity Fee (\$)	Fee Description	Fee Paid
101	760	201	395	Utility filing fee	\$
106	330	206	165	Design filing fee	\$
107	540	207	270	Plant filing fee	\$
108	790	208	395	Reissue filing fee	\$
114	150	214	75	Provisional filing fee	\$
SUBTOTAL (1)					(\$)

## 2. EXTRA CLAIM FEES

Total Claims	Extra Claims	Fee from below	Fee Paid	
13	-20** = 0	\$18	\$0	
Independent Claims	2	-3** = 0	\$86	\$0
Multiple Dependent		\$260	\$0	

\*\*or number previously paid, if greater; For Reissue, see below

Large Fee Code	Entity Fee (\$)	Small Fee Code	Entity Fee (\$)	Fee Description
103	18	203	11	Claims in excess of 20
102	78	202	41	Independent Claims in excess of 3
104	270	204	135	Multiple dependent claims in excess of 3
109	82	209	41	**Reissue independent claims over original patent
110	22	210	11	**Reissue claims in excess of 20 and over original patent

SUBTOTAL (2) \$0

## FEE CALCULATION (continued)

## 3. ADDITIONAL FEES

Large Fee Code	Entity Fee (\$)	Small Fee Code	Entity Fee (\$)	Fee Description	Fee Paid
105	130	205	65	Surcharge - late filing fee	
127	50	227	25	Surcharge - late provisional filing fee or cover sheet.	
139	130	139	130	Non-English specification	
147	2,520	147	2,520	For filing a request for reexamination	
112	920*	112	920*	Requesting publication of SIR prior to Examiner action	
113	1,840*	113	1,840*	Requesting publication of SIR after Examiner action	
115	110	215	55	Extension for reply within first month	
116	380	216	200	Extension of time within second month	
117	870	217	475	Extension of time within third month	
118	1,360	218	755	Extension of time within fourth month	
128	1,850	228	1,030	Extension of time within fifth month	
119	330	219	155	Notice of Appeal	
120	330	220	155	Filing a brief in support of an appeal	330
121	270	221	135	Request for oral hearing	
138	1,510	138	1,510	Petition to institute a public use proceeding	
140	110	240	55	Petition to revive - unavoidable	
141	1,320	241	660	Petition to revive - unintentional	
142	1,320	242	660	Utility issue fee (or reissue)	
143	450	243	225	Design issue fee	
144	670	244	335	Plant issue fee	
122	130	122	130	Petitions to the Commissioner	
123	50	123	50	Petitions related to provisional applications	
126	240	126	240	Submission of Information Disclosure Stmt.	
581	40	581	40	Recording each patent assignment per properly (time number of properties)	
146	790	246	395	Filing a submission after final rejection (37 CFR 1.129(a))	
149	790	249	395	For each additional invention to be examined (37 CFR 1.129(b))	

Other fee (specify)

Other fee (specify)

\*Reduced by Basic Filing Fee Paid

SUBTOTAL (3) \$330

## SUBMITTED BY

Typed or Printed Name

Yingsheng Tong

Signature

Yingsheng Tong

Date

6-24-2004

Complete (if applicable)

Reg. Number

52,305

Deposit Account User ID



**CERTIFICATE OF MAILING OR TRANSMISSION UNDER 37 CFR 1.8**

I hereby certify that the attached document is being deposited with the United States Postal Service with sufficient postage for First Class Mail in an envelope addressed to the Commissioner for Patents, Alexandria, VA 22313-1450 or is being facsimile transmitted on the date indicated below:

6-24-04

Jackie McBride  
Jackie McBride